

CLAIMS

1. A method for applying force on a wafer during chemical mechanical planarization (CMP), comprising:

applying a linear force on a first end of a spindle, the spindle having a wafer carrier coupled to a second end thereof; and

monitoring the linear force applied on the first end of the spindle.

2. A method for applying force on a wafer during CMP as recited in claim 1, wherein the operation of monitoring the linear force applied on the first end of the spindle includes:

measuring the linear force applied to the first end of the spindle with a load cell.

3. A method for applying force on a wafer during CMP as recited in claim 2, wherein the linear force is applied using an air bladder, and the operation of monitoring the linear force applied on the first end of the spindle includes:

adjusting an air pressure within the air bladder so that the air bladder applies a desired amount of linear force on the first end of the spindle.

4. A method for applying force on a wafer during CMP as recited in claim 3, wherein the operation of adjusting the air pressure within the air bladder includes controllably adding air to the air bladder.

5. A method for applying force on a wafer during CMP as recited in claim 4, wherein the operation of adjusting the air pressure within the air bladder includes controllably releasing air from the air bladder.

6. A method for applying force on a wafer during CMP as recited in claim 2, wherein the operation of monitoring the linear force applied on the first end of the spindle further includes:

comparing the force measured by the load cell with a desired force setting.

7. A method for applying force on a wafer during CMP as recited in claim 6, wherein the comparing operation includes:

determining whether the force measured by the load cell is higher than the desired force setting or lower than the desired force setting.

8. A method for applying force on a wafer during CMP as recited in claim 7, further including:

if the force measured by the load cell is higher than the desired force setting, decreasing the linear force applied on the first end of the spindle; and

if the force measured by the load cell is lower than the desired force setting, increasing the linear force applied on the first end of the spindle.

9. A method for applying force on a wafer during CMP as recited in claim 1, wherein the operation of applying a linear force on the first end of a spindle further includes:

transmitting small adjustments in a direct linear manner to the wafer.

10. A method for applying force on a wafer during chemical mechanical planarization (CMP), comprising:

applying a linear force on a spindle, the spindle having a wafer carrier coupled to a wafer holding end thereof; and

monitoring the linear force applied on the spindle.

11. A method for applying force on a wafer during CMP as recited in claim 10, wherein the operation of applying the linear force further includes:

transmitting small adjustments in a direct linear manner to the wafer.

12. A method for applying force on a wafer during CMP as recited in claim 10, wherein the operation of monitoring the linear force applied on the spindle further includes:

measuring the linear force applied to the spindle with a load cell.

13. A method for applying force on a wafer during CMP as recited in claim 12, wherein the linear force is applied using an air bladder, and the operation of monitoring the linear force applied on the spindle includes:

adjusting an air pressure within the air bladder so that the air bladder applies a desired amount of linear force on the spindle.

14. A method for applying force on a wafer during CMP as recited in claim 13, wherein the operation of adjusting the air pressure within the air bladder includes one of controllably adding air to the air bladder and controllably releasing air from the air bladder.

15. A method for applying force on a wafer during CMP as recited in claim 10, wherein applying the linear force on the spindle further includes:

providing pressure in a controllable manner with one of a bladder, motor, hydraulic device, or gears.

16. A method for applying force on a wafer during CMP as recited in claim 12, wherein the operation of monitoring the linear force applied on the spindle further includes comparing the force measured by the load cell with a desired force setting.

17. A method for applying force on a wafer during CMP as recited in claim 16, wherein the comparing operation includes:

determining whether the force measured by the load cell is higher than the desired force setting or lower than the desired force setting.

18. A method for applying force on a wafer during CMP as recited in claim 17, further including:

if the force measured by the load cell is higher than the desired force setting, decreasing the linear force applied on the spindle; and

if the force measured by the load cell is lower than the desired force setting, increasing the linear force applied on the spindle.

19. A method for controlling force to be applied on a wafer during chemical mechanical planarization (CMP), comprising:

generating a linear bladder force on an end of a spindle, the spindle being coupled to a wafer carrier; and

monitoring the linear bladder force applied on the spindle to control an amount of force to be applied to the wafer.

20. A method for controlling force to be applied on a wafer during CMP as recited in claim 20, wherein the operation of applying the linear bladder force on the spindle further includes:

transmitting small adjustments in a direct linear manner to the wafer.